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R -----

H GNIFVVSLSVADMLVAIYPYPLMLHAMSIGGWDLSQLQCQMVGFITGLSVVGSIFNIVAIAINRYCYICH
M GNIFVASLSVADMLVAIYPYPLMLYAMSVGGWDLSQLQCQMVGLVTGLSVVGSIFNITAITAINRYCYICH
R -----YCYICH

H SLQYERIFSVRNTCIYLVITWIMTVLAVLPNMYIGTIEYDPRTYTCIFNYLNNPVFTVTIVCIHFVLPLL
M SLQYKRIFSRLNTCIYLVVTWVMTVLAVLPNMYIGTIEYDPRTYTCIFNYVNNPAFTVTIVCIHFVLPPLI
R SLQYNADLQPANTCIYLVVTWVMTVLDVLPNVYIGTIEYDPRTYTCYFNYVNNPAFTVTIVCIHFVLPPLI

H IVGFCYVRIWTKVLAARDPAGQNPNDNQLAEVRNFLTMEFVIFLLFAVCWCPCINVLTVLVAVSPKEMAGKIP
M IVGYCYTKIWIKVLAARDPAGQNPNDNQFAEVRNFLTMEFVIFLLFAVCWCPCVNVLTVLVAVIPKEMAGKIP
R IVGYCYTKIWIKVLAARDPAGQNPNDNQFAEVRNFLTMEFVIFLL-----

H NWLYLAAAYFIAYFNSCLNAVIYGLLENFRREYWTIFHAMRHPIIFFPGLISDIREMQEARTLARARAH
M NWLYLAAAYCIAYFNSCLNAIIYGILNESFRREYWTIFHAMRHPILFISHLISDIRETWETRALTRARVRA
R -----

H RDQAREQDRAHACPAVEETPMNVNRNVPLPGDAAAGHPDRASGHPKPHSRSSSAYRKSASTHHKSVFHSK
M RDQVREQERARACVAVEGTPRNVNRNVLLPGDASAPHSDRASVRPKPQT-----RSTSVYRK
R -----

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Fig. 1A

H AASGHLKPVSGHSKPASGHPKSA-TVYPKPASVHFVKGDSVHFVKPDSVHFVKPASSNPKPITGHH  
M PASIHHKSI SGHPKSA SVYPKPASSVHCKPASVHFVKPASVHFVKGDSVYFKGDTVHYRAAS---KLVTSHR  
R -----  
  
H VSAGSHSKSAFSAATSHPKP-----IKPATSHAEP TTADYPKPATT SHPKPAAADNP ELSASHCPEIPAIA  
M ISAG-----PSTSHPTSMAGYIKSGTSHPATTTVDYLEPATTTSHSVLTAVDLPEVSASHCLEMENTSTG  
R -----  
  
H HPVSDSDLPESASSPAAGPTKPAASQLES DTIADLPDPTVVTTSTNDYHDVVVVD-----VEDDPDEMAV  
M HLRAD-----ISASVLPSVPFELAATP-----PDTTAIP IASGDYRKVVLI DDDSDDCSDEMAV  
R -----

Fig. 1B

TGTTTGCTGTGGACCTGGCTGCTGATCCTGAGCCTGCTGGGAGATCTTAACGATCCCCAGAGCAACATGGGGCCCCACCCCTAG  
CGGTTCCCAACCCCTATGGCTGTATTGGCTGTAAAGTACCCAGCCAGAAATACCCACCGGCTCTAATCATCTTTATGTTCTGCGC  
GATGGTTATCACCATCGTTGTAGACCTAATCGGCAACTCCATGGTCATTTTGGCTGTGACGAAGAACAGAAGCTCCGGAATTCT  
GGCAACATCTTCGTGGTCAGTCTCTGTGTGGCCGATATGCTGTGGCCATCTACCCATACCCCTTTGATGCTGCATGCCATGTCCA  
TTGGGGGCTGGGATCTGAGCCAGTTACAGTGCCAGATGGTCGGGTTCAATCACAGGGCTGAGTGTGGTGGCTCCATCTTCAACAT  
CGTGGCAATCGCTATCAACCGTTACTGCTACATCTGCCACAGCCCTCCAGTACGAACGGATCTTCAGTGTGCGCAATACCTGCATC  
TACCTGGTCATCACCTGGATCATGACCGTCTGGCTGCTGCCCAACATGTACATTTGGCACCATCGAGTACGATCCTCGCACCT  
ACACCTGCATCTTCAACTATCTGAACAACCCCTGTCTTCACTGTTACCATCGTCTGCATCCACTTCGTCTCTCCCTCTCCATCGT  
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CAACGCTGTGATCTACGGGCTCCTCAATGAGAAATTTCCGAAGAGAAATCTGGACCATCTTCCATGCTATGCGGCAACCCCTATCATA  
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CTCGTGAACAAGACCGTGCCCATGCCCTGTCTGTGGAGGAAACCCCGATGAATGTCCGGAATGTTCCATTTACCTGTGATGC  
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CACCAAGTCTGTTTAGCCACTCCAAAGGCTGCCCTCTGGTCAACCTCAAGCCTGTCTCTGGCCACTCCAAAGCCTGCCCTCTGGTC  
ACCCCAAGTCTGCCACTGTCTACCCCTAAGCCTGCCCTCTGTCCATTTCAGGGTGACTCTGTCCATTTCAGGGTGACTCTGTCCA  
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ATCCCAAGCCTGCCACTACCAGCCACCCCTAAGCCCGCTGCTGCTGACAAACCCCTGAGCTCTCTGCCCTCCCATTTGCCCGAGATCCC  
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AGCCAGCTGGAGTCTGACACCATCGCTGACCTTCTCTGACCCCTACTGTAGTCACTACCAAGTACCAATGATTACCATGATGTCGTGG  
TTGTTGATGTTGAAGATGATCCTGATGAAATGGCTGTGTGAAAAATGCTCTCGTAGGTGGCCAGGCAGT

Fig. 2A

AAGATCCTGAGCTTGCCCTGGGAGGAATGGCCACGGTCCCAAGAGCAACATGGACCTACAAGGCGGTTCCACCCCATTCGGC  
TGCAATTGGCTGTAAAGCTGCCAAGACCCGACTACCCGCCAGCTCTAATCATCTTTCATGTTCTGCGCAATGGTCATCACAGTCGTGCG  
TAGACCTGATCGGGAACCTCCATGGTCAATTTGGCTGTGACCAAGAACAAGAGCTCCGAAATTCGGCAACATCTTTGTGGCCAG  
CCTCTCTGTGGCAGACATGCTGGTGCCCATCTACCCCTACCCCTTTGATGCTGTATGCCATGTCAAGTTGGGGCTGGGATCTGAGT  
CAGCTCCAGTGCCAGATGTCGGGTTGGTCACAGGACTGAGCGTAGTCGGTTCATCTTCAACATTAAGTCCCATTCGCAATCAACC  
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CCTCAATGAGAGTTTCCGAAGAGAAATACTGGACCACTTCCATGCTATGCGCACCCCTATCCTGTTCACTCTCACCTCATCAGT  
GATATTCGGGAGACTTGGGAGACCCGAGCTCTCACTCGTCCCGTGTCGGTCAAGTCCGAGAGCAAGAGCGTGCTC  
GTGCTGTGTCGCTGTGGAGGGACCCCAAGGAACGTCCGGAATGTTCTACTGCTGCTGATGCAATCAGCACCCCACTCTGATCG  
TGCCCTCTGTCCGTCCTCAAGCCCAACAGGCTACTTCTGTCTACCGCAACCTGCCCTCTATCCACCACAAGTCTATTCTGGC  
CACCCCAAGTCTGCCCTCTGTTACCCCTAAGCCAGCCTCCTCTGTCCATTGCAAGCCTGCCCTCTGTCCATTTCAAACCCGCCCTCTG  
TTCATTTCAAGGTGACTCTGTCTATTTCGAAGGGAGACACTGTCCATTACAGGGCTGCTTCCAAACTTGTCAACAGTCACCGTAT  
CTCTGCTGGCCCTTCCACAGTCACCCCTACATCCATGGCTGGCTACATTAAATCTGGTACCAAGCCACCCCTGCCACCACTGTT  
GACTATCTCGAACCCTGCCACCACTCTGTGCTCACTGCTGCGACCTCCCTGAGGCTCAGCCTCCCATTCGCTTGAGA  
TGACCAGCACTGGCCACCTCAGAGCTGACATTTCTGCCCTCTGTCCCTTCTGTACCCCTTCGAGCTTGTGCCACCCCTCCTGA  
TACCACTGCAATCCCCCATTTGCCCTCTGGTGATTACCGCAAGGTCGTGCTTATTGATGATGATTCTGATGATTCTGATGCTCTGAT  
GAGATGGCTGTGTA

Fig. 2B

TACTGCTACATCTGCCACAGCCTCCAGTACAATGCGGATCTTCAGCCTGCTAACACTTGCATCTATCTGGTTGTACCTGGGTCA  
TGACTGTTCTGGATGTCCTGCCCTAATGTGTACATTGGCACCAATTGAGTATGACCCCTCGCACCTACACCTGCTACTTCAACTATGT  
GAACAACCCCTTACTGTGACCAATTGTCTGCATCCACTTCGTCCTCCCTCTCATCATAGTCGGTTATTGCTACACAAAAATC  
TGGATCAAAGTGCTGGCAGACCGGGACCCAGCTGGACAGAAATCCTGACAACCAGTTTGCTGAGGTTCCGAAATTTTCTAACCATGT  
TTGTGATCTTCCTCCTT

**Fig. 2C**

Fig. 3



Fig. 4B

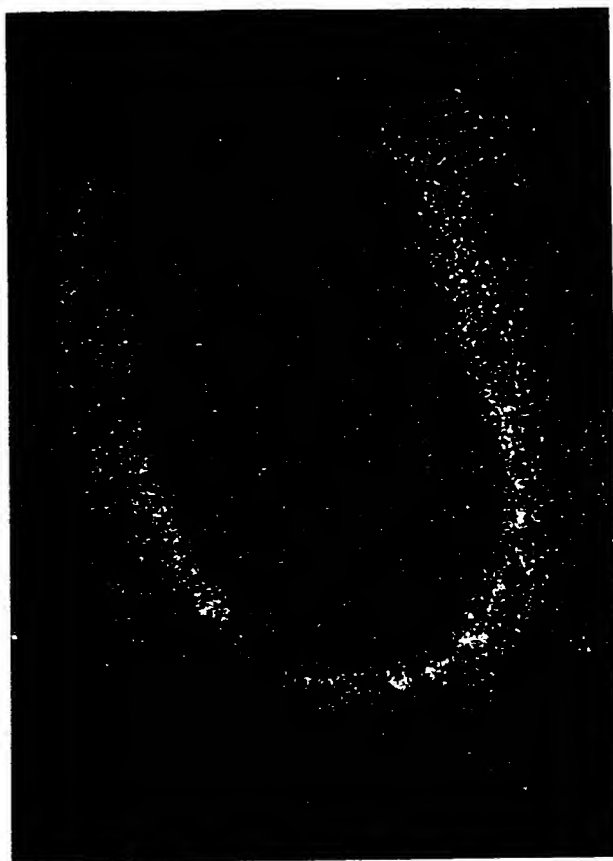


Fig. 4A





Vertebral Disk

Fig. 4C

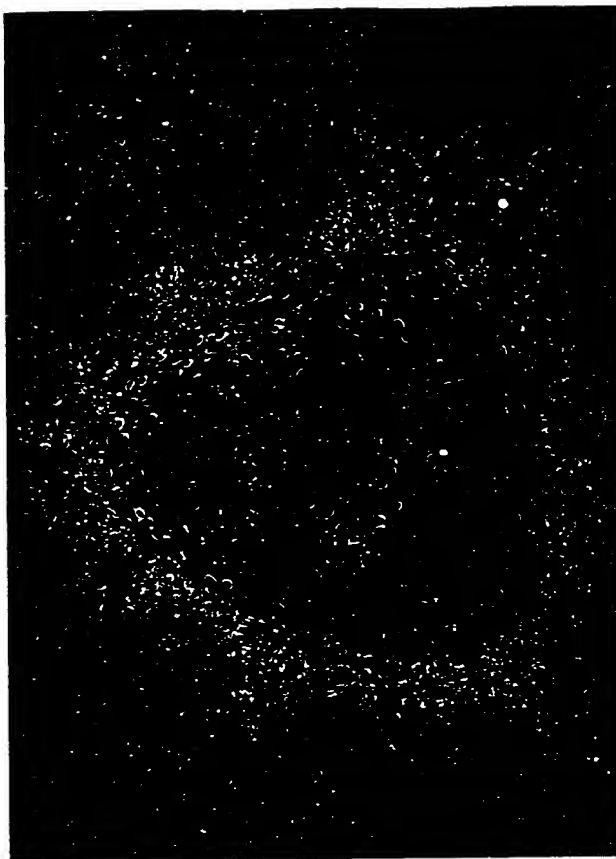


Fig. 4D



M G P T L A V P T P Y G C I G C K

M

17

⌊

**Fig. 5A**

AF003625	27839	aagctccggaattctgg	
U52219	241	aagctccggaattctgg	
MRR AA	58	K L R N S G	
AF003625	30712	ttcaggcaacatcttcgtggtcagtcctctctgtggccgatatgctggtggccatctaccc	
U52219	252	ttctggcaacatcttcgtggtcagtcctctctgtggccgatatgctggtggccatctaccc	
MRR AA	62	S G N I F V V S L S V A D M L V A I Y P	
AF003625	30772	ataccctttgatgctgcattgccatgtccattgggggctgggatctgagccagttacagtg	
U52219	312	ataccctttgatgctgcattgccatgtccattgggggctgggatctgagccagttacagtg	
MRR AA	82	Y P L M L H A M S I G G W D L S Q L Q C	
AF003625	30832	ccagatgggtcgggttcattcacagggtgagtggtcggtcccatcttcaacatcgtggc	
U52219	372	ccagatgggtcgggttcattcacagggtgagtggtcggtcccatcttcaacatcgtggc	
MRR AA	102	Q M V G F I T G L S V V G S I F N I V A	

Fig. 5B

AF003625	30892	aatcgctatcaaccgttactgctacatctgccacagcctccagtacgaacggatcttcag	
U52219	432	aatcgctatcaaccgttactgctacatctgccacagcctccagtacgaacggatcttcag	
MRR AA	122	I A I N R Y C Y I C H S L Q Y E R I F S	
AF003625	30952	tgtgcgcaatacctgcattctacctgggtcatcacctggatcatgaccgtcctggctgtcct	
U52219	492	tgtgcgcaatacctgcattctacctgggtcatcacctggatcatgaccgtcctggctgtcct	
MRR AA	142	V R N T C I Y L V I T W I M T V L A V L	
AF003625	31012	gcccacaatgtacattggcaccatcgagtagatcctcgcacctacacctgcatcttcaa	
U52219	552	gcccacaatgtacattggcaccatcgagtagatcctcgcacctacacctgcatcttcaa	
MRR AA	162	P N M Y I G T I E Y D P R T Y T C I F N	
AF003625	31072	ctatctgaacaaccctgtcttctactgttaccatcgtctgcaccttcgtcctccctct	
U52219	612	ctatctgaacaaccctgtcttctactgttaccatcgtctgcaccttcgtcctccctct	
MRR AA	182	Y L N N P V F T V T I V C I H F V L P L	

Fig. 5C

AF003625	31132	cctcatcgtgggtttctgctacgtgaggatctggaccaaaagtctggcgcccgtagacc
U52219	672	cctcatcgtgggtttctgctacgtgaggatctggaccaaaagtctggcgcccgtagacc
MRR AA	202	L I V G F C Y V R I W T K V L A A R D P
AF003625	31192	tgcagggcagaatcctgacaaccaacttgctgaggttcgcaattttctaaccatgtttgt
U52219	732	tgcagggcagaatcctgacaaccaacttgctgaggttcgcaattttctaaccatgtttgt
MRR AA	222	A G Q N P D N Q L A E V R N F L T M F V
AF003625	31252	gatcttcctcctctttgcagtgctggtggccctatcaacgtgctcactgtcttggtggc
U52219	792	gatcttcctcctctttgcagtgctggtggccctatcaacgtgctcactgtcttggtggc
MRR AA	242	I F L L F A V C W C P I N V L T V L V A
AF003625	31312	tgtcagtcgccgaaggagatggcagggaagatcccccaactggctttatcttgcagcctactt
U52219	852	tgtcagtcgccgaaggagatggcagggaagatcccccaactggctttatcttgcagcctactt
MRR AA	262	V S P K E M A G K I P N W L Y L A A Y F

Fig. 5D

AF003625	31372	catagcctacttcaacagctgcctcaacgctgtgatctacgggctcctcaatgagaattt	
U52219	912	catagcctacttcaacagctgcctcaacgctgtgatctacgggctcctcaatgagaattt	
MRR AA	282	I A Y F N S C L N A V I Y G L L N E N F	
AF003625	31432	ccgaagagaatactggaccatcttccatgctatgcggcaccctatcatattcttctctgg	
U52219	972	ccgaagagaatactggaccatcttccatgctatgcggcaccctatcatattcttccctgg	
MRR AA	302	R R E Y W T I F H A M R H P I I F F P G	
AF003625	31492	cctcatcagtgatattcgtgagatgcaggagcccgctaccctggcccgcccggtgcccc	
U52219	1032	cctcatcagtgatattcgtgagatgcaggagcccgctaccctggcccgcccggtgcccc	
MRR AA	322	L I S D I R E M Q E A R T L A R A R A H	
AF003625	31552	tgctcgcgaccaagctcgtgaacaagaccgctgcccatgcctgtcctgctgtggaggaaac	
U52219	1092	tgctcgcgaccaagctcgtgaacaagaccgctgcccatgcctgtcctgctgtggaggaaac	
MRR AA	342	A R D Q A R E Q D R A H A C P A V E E T	

Fig. 5E

AF003625	31612	cccgatgaatgtccggaatgttccattacctggatgctgcagctggccaccccgaccg
U52219	1152	cccgatgaatgtccggaatgttccattacctggatgctgcagctggccaccccgaccg
MRR AA	362	P M N V R N V P L P G D A A A G H P D R
AF003625	31672	tgcctctggccaccctaaagccccattccagatcctcctctgcctatcgcaaatctgcctc
U52219	1212	tgcctctggccaccctaaagccccattccagatcctcctctgcctatcgcaaatctgcctc
MRR AA	382	A S G H P K P H S R S S A Y R K S A S
AF003625	31732	taccaccacaagtctgtcttttagccactccaaggctgcctctggtcacctcaagcctgt
U52219	1272	taccaccacaagtctgtcttttagccactccaaggctgcctctggtcacctcaagcctgt
MRR AA	402	T H H K S V F S H S K A A S G H L K P V
AF003625	31792	ctctggccactccaagcctgcctctggtcacccccaaagtctgccactgtctaccctaagcc
U52219	1332	ctctggccactccaagcctgcctctggtcacccccaaagtctgccactgtctaccctaagcc
MRR AA	422	S G H S K P A S G H P K S A T V Y P K P

Fig. 5F

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AF003625 31852 tgcctctgtccatttcaagggtgactctgtccatttcaagggtgactctgtccatttcaa
U52219      1392 tgcctctgtccatttcaagggtgactctgtccatttcaagggtgactctgtccatttcaa
MRR AA      442   A S V H F K G D S V H F K G D S V H F K K

AF003625 31912 gcctgactctgttcatattcaagcctgcttccagcaaccccaagcccatcactggccacca
U52219      1452 gcctgactctgttcatattcaagcctgcttccagcaaccccaagcccatcactggccacca
MRR AA      462   P D S V H F K P A S S N P K P I T G H H

AF003625 31972 tgtctctgtggcagccactccaagtctgccttcagtgctgccaccagccaccctaaacc
U52219      1512 tgtctctgtggcagccactccaagtctgccttcagtgctgccaccagccaccctaaacc
MRR AA      482   V S A G S H S K S A F S A A T S H P K P

AF003625 32044 catcaagccagctaccagccatgctgagccaccactgctgactatcccaagcctgccac
U52219      1572 catcaagccagctaccagccatgctgagccaccactgctgactatcccaagcctgccac
MRR AA      502   I K P A T S H A E P T A D Y P K P A T

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Fig. 5G

AF003625	32104	taccagccaccctaaagccactgctgctgacaacccctgagctctctgcctcccatggccc
U52219	1632	taccagccaccctaaagccgctgctgctgacaacccctgagctctctgcctcccatggccc
MRR AA	522	T S H P K P A A A D N P E L S A S H C P
AF003625	32164	cgagatccctgccattgcccaccctgtgtctgacgacagtgacctccctgagtcggcctc
U52219	1692	cgagatccctgccattgcccaccctgtgtctgacgacagtgacctccctgagtcggcctc
MRR AA	542	E I P A I A H P V S D D S D L P E S A S
AF003625	32224	tagccctgccgctggggccaccaagcctgctgccagccagctggagcttgacaccatcgc
U52219	1752	tagccctgccgctggggccaccaagcctgctgccagccagctggagcttgacaccatcgc
MRR AA	562	S P A A G P T K P A A S Q L E S D T I A
AF003625	32284	tgaccttcctgaccctactgtagtcactaccagtagtaccaatgattaccatgatgtcgtggt
U52219	1812	tgaccttcctgaccctactgtagtcactaccagtagtaccaatgattaccatgatgtcgtggt
MRR AA	582	D L P D P T V V T T S T N D Y H D V V V

Fig. 5H



[illegible]